

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D. C. 20554**

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JUL - 1967

Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies

ET Docket No. 92-9

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

TO: The Commission

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**REPLY COMMENTS OF THE
SOCIETY OF BROADCAST ENGINEERS, INCORPORATED**

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Christopher D. Imlay
Booth, Freret & Imlay
1233 20th Street, N. W.
Suite 204
Washington, D. C. 20036
(202) 296-9100

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SUMMARY

A review of the comments filed in the instant proceeding reveals that two PCS proponents, Motorola, Inc. and Communications Satellite Corporation (COMSAT), urge reallocation of the 1990-2110 MHz band. Motorola ignores the OET study and nevertheless urges that the Commission reallocate existing TV Auxiliary stations to other bands. COMSAT acknowledges the impracticality of attempting to move mobile ENG stations to some other band where mobile stations would have to co-exist with fixed stations, but then argues that 2 GHz ENG stations could share their frequencies with proposed Mobile Satellite Service (MSS) stations. Since there would be hundreds, if not thousands of mobile or portable uplink stations in the MSS scenario, ENG receive sites would be at risk or be subject to interference from these uplinks. SBE reply comments note that mobile stations can't be reallocated to a band where they would have to share with fixed stations and the COMSAT comments (mobile MSS uplink stations would cause interference to fixed ENG receive sites). Furthermore, TV stations have their own "emerging technology" in the form of HDTV, and the continued allocation of the 2 GHz ENG band is needed to support that technology, which can also claim to have competitiveness and national economic advantages.

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TO: The Commission

**REPLY COMMENTS OF THE
SOCIETY OF BROADCAST ENGINEERS, INCORPORATED**

The Society of Broadcast Engineers, Incorporated (SBE), the national association of broadcast engineers and technical communications professionals, with more than 6,000 members in the United States, hereby respectfully submits its reply comments in the above-captioned proceeding relating to the reservation of spectrum for emerging technologies. Specifically, these reply comments address protection of the 2 GHz electronic news gathering (ENG) band.

I. THE MOTOROLA COMMENTS

Motorola, Inc. (Motorola) argues that the 2 GHz ENG band should be displaced, to allow new spectrum for personal communications services (PCS). Motorola pushes several rhetorical buttons in its comments to suggest grave consequences unless the PCS spectrum it demands (apparently in non-negotiable terms), is not made available exactly as Motorola proposes. It suggests the following results: (1) Loss of U. S. economic growth; (2) Off-shore interests gaining a marketing advantage; (3) Loss of U. S. lead in "exporting wireless products and services"; (4) Unspecified damage to communications requirements of utilities, public safety entities, petroleum companies, railroads, and others.

Motorola's plan to allow for "private PCS" to accommodate needs of displaced users through implementation of spectrum-efficient PCS technology is a "black hole" proposal as far as Part 74 users are concerned: we cannot know what is really happening inside it, but our sensors tell us it is very dangerous. The cost for individual operations will likely be set by major providers, much the way cellular telephone and satellite costs are set. Right now, based on existing Commission policy, likely licensing fees might well prevent this from ever happening. SBE notes that Motorola does not specifically suggest that the price of licensing new spectrum be borne by PCS proponents as part of their "full compensation" recommendation.

The burden of establishing that compression technologies will indeed be cost-effective and technically sound solutions for Part 74 operations now being conducted in the 2 GHz band should be on those touting these solutions as a justification for the deprivation of current spectrum allocations. In the considered opinion of the Part 74 National All Industry Advisory Council (NAIAC) on Part 74 coordination matters, this technology will neither be ready for implementation in the near future, nor will it be cost-effective as an ENG solution when (or if) it is ready.

Although Motorola states that it supports "full compensation" to incumbent users for the cost of relocating to alternate bands, the following question remains:

What if there is no suitable alternate band in the opinion of technical experts familiar with the needs of potentially displaced ENG users?

What may appear to Motorola to be a "genuine reaccommodation opportunity", may well be nothing more than the banishment of ENG users (albeit all expenses paid) to the spectral equivalent of Devil's Island. Information supplied by SBE, Group W, the National Association of Broadcasters (NAB), the major networks, as well as information developed by the FCC itself, makes a very strong case for careful evaluation of what Motorola portrays as suitable spectrum for ENG. The offer to buy broadcasters a one-way ticket may seem magnanimous superficially, but ongoing and much higher operational costs of

systems in higher microwave bands do not seem to be covered in what some present as a "genuine reaccommodation opportunity".

The number of users, and the span of time of use demonstrated in SBE's submissions to the Commission on this subject, and as well in the Southern California Frequency Coordinating Committee's (SCFCC) Home Channel Plan presented in NAB's comments, are strong evidence that ENG is not the trivial relocation project that Motorola suggests.

II. EMERGING TECHNOLOGIES BENEFITS SHOULD NOT BE ACHIEVED AT THE EXPENSE OF ENG OPERATIONS, WHICH SERVE THE PUBLIC

The debatable, and unproven benefits of PCS should not be achieved at the expense to the public of the loss of ENG operations. It is clear from the comments filed by SBE, NAB, Group W, Cable News Network (CNN), and other entities, as well as by the Commission's own internal study, why the Commission rejected the 1990-2110 MHz band (Channels A-1 through A-7) used for ENG and the 2500-2686 MHz band (ITFS/MMDS Channels A-1 through G-4) used for Instructional Television Fixed Service (ITFS) and Multichannel Multipoint Distribution Service (MMDS) stations. That conclusion must stand intact and unmodified unless and until proven and cost-effective technological solutions for the unique needs and problems of ENG are established.

Motorola's contention that "many television broadcasters employ satellite transmissions as an alternative to terrestrial ENG links" is very much in error for the following reasons:

1. Virtually every VHF TV station in the top 50 markets uses ENG as an integral part of its local news coverage. There is simply not enough satellite spectrum available for them all to exist.
2. Even if the spectrum were available, the cost of an ENG satellite truck (approximately \$500,000) must be weighed against the under \$100,000 cost of an ENG vehicle. There is no ready ability of many stations to afford ENG facilities.
3. The cost of personnel and maintenance for satellite ENG vehicles is several orders of magnitude above what is needed for a standard ENG truck.
4. Space segment for ENG is expensive, and is an ongoing expense. Once a TV station invests in ENG equipment, there is no ongoing cost each time a path is used.

SBE must also vigorously challenge Motorola's statement that "video compression technology improvements should allow accommodation of legitimate auxiliary broadcast needs in far less spectrum". There is not a shred of hard technical evidence submitted by Motorola that would support that statement. The burden lies with Motorola, as the Comment process is intended to provide hard evidence to support its claims.

SBE suggests that Motorola's case would be strengthened significantly if it had presented in its comments a cost-effective and high-quality compression technology as part of their self-admitted billion dollar research effort.

III. ONLY FIXED USERS CAN BE RELIABLY ACCOMMODATED IN OTHER BANDS

SBE agrees with Motorola that fixed links can generally be accommodated in other bands, especially if unlimited funding exists to install high performance or ultra-high performance antennas. SBE notes, however, that a high performance 8-foot diameter Category A antenna costs around \$8,000, and that an 8-foot diameter ultra-high performance antenna costs around \$12,000. Further, for a new fixed link to be "shoe-horned" into an existing band, existing receive antennas may also have to be upgraded. For ultra-high performance, or shrouded, antennas, the supporting structure may first have to be strengthened before the additional wind loading of a shrouded antenna can be safely accommodated. SBE questions whether Motorola has properly ascertained the cost of relocating even the relatively few fixed links left in the 2 GHz band to the 7 GHz, or other, bands.

Even if it had, Motorola still does not understand that in the major markets, STL's and ICR's have already been shifted to higher bands. The primary reason for this voluntary shifting of fixed links out of the 2 GHz band is to allow unrestricted use of portable and mobile 2 GHz ENG stations. A secondary reason was that only the very longest fixed paths require the lower propagation loss of the 2 GHz band.

Motorola's path length calculations, while accurate and enlightening, therefore only serve to prove a point that is not disputed by the SBE: the typical "reach" of a 7 GHz band microwave system can accommodate most STL and ICR path lengths.

But, as SBE has pointed out several times in the past, the problem is the impracticality of relocating portable or mobile stations; that is, TV Pickup, or ENG stations. Since the location of such stations is constantly or often changing, the path geometries to fixed links are also always changing. Even if the large and highly directive Category A parabolic antennas that allow frequency re-use between two or more fixed links could be practicably used on mobile or portable platforms such as ENG trucks, news helicopters, and blimps, those highly directive and spectrum-efficient antennas would still not be a solution because of the changing path geometries.

Fiber optics will not be a solution, as fiber optic links are only practical from one fixed location to another fixed location. Fiber optic links would also most likely involve ongoing tariff charges that would have to be paid to the telephone company, the only entity likely to have the authority, as a common carrier, to lay fiber cables across multiple jurisdictional boundaries. Even then, the telephone company may have little incentive to install a fiber optic cable to a remote mountaintop site with a potential of only a few customers. For example, when the SCFCC recently investigated the possibility of establishing a fiber optic link from the Hollywood area to Mt. Wilson, BELCOR (one of the major providers of fiber optics technology) quoted a cost of \$200,000 just to conduct the feasibility study for such a link!

Motorola is correct in asserting that spectrum availability is the stumbling block that must be overcome. It should be incumbent on Motorola, as the self-professed leader in research and technology in the telecommunications field, to use its technical resources to help the FCC and users like broadcasters hurdle currently insurmountable problems. The SBE respectfully suggests that Motorola devote a small

portion of its one billion dollar research program to building technical bridges, rather than pushing broadcasters off the cliff.

It is difficult to oppose change without appearing to be resisting progress, even when the alleged benefits sound suspiciously like the "blue sky" promises of the late 70's and early 80's for miraculous new services that cable television would bring, and even if one has valid technical reasons for opposition. When viable means exist by use of less bandwidth (i.e., channel compression) to successfully accommodate ENG so the ongoing costs and burdens are within reasonable limits, the SBE will encourage its more than one hundred affiliated frequency coordinating committees nationwide to take advantage of the benefits that progress and the promise of "emerging technologies" will bring to all our endeavors.

IV. COMSAT COMMENTS

Communications Satellite Corporation (COMSAT) claims that 2 GHz ENG stations can share frequencies with the Mobile Satellite Service (MSS) "if certain guidelines are followed to minimize interference." SBE suggests that these proposed "guidelines" are unworkable, and must be rejected.

A. MSS Interference to ENG

COMSAT concludes that MSS terrestrial mobile terminals operating with "relatively high power" could avoid interfering with ENG receive sites by never transmitting from a terrestrial site that is within "10 to 15 degrees" of the main beam axis of an ENG receive antenna and maintain at least a 20-kilometer separation from the ENG receive site¹. These are unworkable conditions, for the following reasons:

1. Many ENG receive sites utilize omnidirectional receive antennas, since it is never known from which direction an ENG transmission may need to originate. Alternatively, ENG sites utilize a remotely

¹ The SBE notes that the 20-kilometer figure is based on the assumption of an ENG path of 50 kilometers (30 miles). This assumption is flawed, in that ENG paths of 80 kilometers (50 miles) are routinely used by TV stations in the Los Angeles market.

steerable receive dish. Thus, the concept of a precluded arc 10 to 15 degrees from the main beam of an ENG receive antenna is invalid.

2. An even more fundamental question is how one could enforce a given radius exclusion zone from an ENG receive site, when hundreds if not thousands of mobile terminals operated by system subscribers would presumably be involved. SBE believes that it is unrealistic to expect that locations of mobile (or portable) terminals could somehow be restricted. Further, a preclusion radius of more than 20 kilometers would be required, because one could never assume that a mobile terminal would not be in the main beam of a steerable ENG receive antenna.

3. Many ENG receive sites are located on tall towers in the center of population areas. Even if a means to ensure that a MSS portable or mobile terminal would not be operated within a given radius of an ENG receive site, the preclusion created by a centrally-located ENG receive site would encompass such a large portion of what would presumably be the prime operational area for mobile terminals as to make the two services mutually exclusive.

4. Even if sharing of the 2 GHz ENG band was conditioned on the absence of MSS uplinks within a specified area, the future expansion of ENG receive sites would then become limited or precluded. At best, frequency sharing between MSS and ENG would halt any expansion of existing ENG systems, and preclude the establishment of ENG in those smaller TV markets that do not currently utilize ENG, but currently at least have the option of establishing an ENG system if the station format and finances allow at a future date.

B. ENG Interference to MSS

One restriction on ENG operations that COMSAT would have the Commission impose is that an "unmodulated TV carrier without energy dispersal" not be transmitted. Restrictions on present ENG operations are far outside the scope of this proceeding, and it is improper for COMSAT to raise such here. Nonetheless, as a substantive matter, SBE would have no objection to such a restriction, provided

that a "TV signal without energy dispersal" is not considered to include transmission of a steady-state TV signal such as an ID slide, or color bars, which are typically transmitted prior to or after the transmission of the actual news (or similar) program material being relayed.

COMSAT also concludes that ENG stations "should" avoid illuminating the geostationary orbit with their main beam of "near-in sidelobes". Even though COMSAT uses the advisory word "should" rather than the mandatory word "must", SBE assumes that COMSAT really seeks a mandatory restriction. This would not be a practical restriction for several reasons:

1. ENG transmitters must often transmit with relatively steep elevation angles, especially where a direct shot from a newsworthy site is obstructed by tall buildings. Suitable return paths, utilizing "building bounce", sometimes require experimental probing of non-direct paths to an ENG receive antenna on a nearby tall tower or mountaintop site. During such probing the geostationary arc could easily be illuminated. COMSAT's comment thus implicitly recognizes the inherent incompatibility between present broadcast auxiliary use of the band and its proposed use thereof.

2. ENG links are sometimes established by relaying the signal to a helicopter or blimp. Such shots could, of necessity, also directly illuminate the geostationary satellite arc.

3. The COMSAT MSS to ENG interference calculations shown in its Appendix A, Section I, Table 1, assume that an ENG transmitting antenna will have the following off-axis suppression in the elevation plane:

<u>Angle from main beam</u>	<u>Antenna Gain</u>	<u>Relative Sidelobe response</u>
0 degrees	20 dBi	0 dB
<u>±6</u>	19.5	-0.5
<u>±12</u>	14	-6
<u>±24</u>	2	-18
<u>±42</u>	0	20

SBE notes that this radiation pattern envelope approximates the elevation pattern of the widely used Nurad, Inc. (Nurad) Silhouette™ antenna. However, many less-directive "rod-style" ENG antennas

remain in use by existing television stations. Since those antennas have an even broader elevation pattern than the presumed Silhouette™ antenna, either the COMSAT interference calculations are too optimistic, or minimum antenna performance specifications for ENG mobile transmitters would have to be adopted. This, in turn, would require many ENG stations to upgrade their transmitting antennas. The cost of such upgrades, if required, should be borne by the newcomer service.

Because of these problems, the SBE reiterates that sharing, as proposed by COMSAT, is not practical and should not be proposed. If the Commission were to nonetheless propose some sharing arrangement in a further rule making proceeding, SBE urges that, rather than delete Channel A-1 from the 2 GHz ENG band, as suggested by COMSAT, MSS stations operating in between 1990-2008 MHz must be required to accept any interference that might be caused by ENG operations on Channel A-1, and be prohibited from causing interference to ENG operations. Overall, it would appear from the foregoing that no sharing is possible.

V. TELEVISION HAS ITS OWN "EMERGING TECHNOLOGY" THAT REQUIRES RETENTION OF THE PRESENT 2 GHZ ALLOCATION

The Television Broadcast Service has its own "emerging technology" that requires every portion of currently allocated TV Auxiliary spectrum, in the form of Advanced Television Systems (ATV). As properly noted at Paragraph 46 of the recently released Second Report and Order and Further Notice of Proposed Rule Making in Docket No. 87-268²,

...the broadcast auxiliary spectrum is already congested, most severely in major markets, where ATV implementation will first occur. We have, however, taken pains to protect broadcast auxiliary spectrum allocations in the 1990-2110 MHz band, despite intense,

² "Advanced Television Systems and Their Impact Upon the Existing Television Broadcast Service" released May 8, 1992.

competing need for additional spectrum by new services. Moreover, there is no additional spectrum at hand for broadcast auxiliary purposes.³

Thus, broadcasters have their own compelling need to at least retain, if not expand, the existing allocation at 2 GHz, on the grounds of, inter alia, international competitiveness and potential economic benefit. But, unlike the "blue sky" proposals of the unproven potential of PCS, television broadcasters' use of the 2 GHz band, and the benefit therefrom to the public, is a "given". This was noted effectively in the separate statement of Commissioner Ervin S. Duggan in the NPRM in the instant proceeding:

...I wish to express my strong concern that when there is any danger of displacing proven communications services in favor of unproven or speculative serves, a heavy burden of proof rests upon us.

SBE feels that this important point is especially relevant here.

VI. SUMMARY

Both Motorola and COMSAT covet the 2 GHz ENG band, even in light of the OET report⁴ which concluded that it is not practicable to relocate the 2 GHz Broadcast Auxiliary users to some other band. Motorola would have the Commission ignore that conclusion (in the absence of countervailing

³ SBE finds it ironic that the Commission now acknowledges that the Broadcast Auxiliary microwave spectrum is congested, especially in the major markets. This is exactly what SBE told the Commission in its petition for rule making and comments filed February 27, 1990, which proposed criteria for the term "frequency congested area", relative to the determination whether a Category B or a Category A transmitting antenna must be employed for fixed links in the TV Auxiliary bands. The SBE petition generated MM Docket 90-500, "Definition of Congested Area in the Broadcast Auxiliary Services and the Cable Television Relay Service". But in a decision released only 8 days before the October 1, 1991, deadline for pre-1981 "grandfathered" STL and ICR stations in "frequency congested areas" to upgrade their antennas to Category A, the Commission concluded in essence that there were no frequency congested areas in the TV Auxiliary bands in the United States, and thereby eviscerated its previously expressed goal of fostering spectrum efficiency in frequency congested areas by requiring new links to install Category A antennas and existing links to upgrade to Category A by the end of a generous 10-year grandfather period originally scheduled to sunset on October 1, 1991.

⁴ "Creating New Technology Bands for Emerging Telecommunications Technology", FCC/OET Report Number TS92-1, January 1992.

evidence) and displace thousands of portable and mobile ENG stations to some other band, where those stations would somehow not cause or receive interference. On the other hand, COMSAT acknowledges the OET conclusion but would have the Commission believe that the 2 GHz ENG band can be successfully shared with MSS stations.

The Commission should "stick to its guns" and uphold the conclusions reached in the OET report. Contrary to Motorola's claims, mobile users cannot share with fixed links. Motorola should be instructed to justify its "voodoo engineering" and study the proven principles of compatible sharing of spectrum. COMSAT is guilty of the same bogus technological arguments, when it proposes sharing of the 2 GHz band by portable and mobile MSS uplink stations which would somehow be kept at least 20 kilometers from all existing ENG receive sites.

Therefore, the foregoing considered, the Society of Broadcast Engineers again respectfully requests that the Commission make no change in the Part 74 frequency allocations in this proceeding.

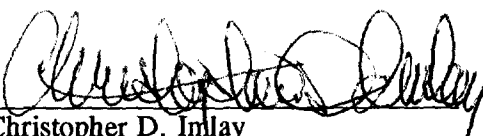
Respectfully submitted,

SOCIETY OF BROADCAST ENGINEERS, INC.

By Richard Farquhar
Richard Farquhar, President

Dane E. Ericksen
Dane E. Ericksen, P.E.
Chairman, SBE FCC Liaison Committee

Richard A. Rudman
Richard A. Rudman, Chairman
SBE Frequency Coordination Task Force


Christopher D. Inlay
General Counsel

July 6, 1992

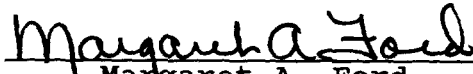
BOOTH, FRERET & IMLAY
1233 20th Street, N. W.
Suite 204
Washington, D. C. 20036
(202) 296-9100

CERTIFICATE OF SERVICE

I, Margaret A. Ford, Office Manager of the law firm of Booth, Freret & Imlay, do hereby certify that copies of the foregoing REPLY COMMENTS OF THE SOCIETY OF BROADCAST ENGINEERS, INCORPORATED were mailed this 6th day of July, 1992, to the offices of the following:

Michael D. Kennedy, Director
Regulatory Relations
Motorola, Inc.
1350 I Street, N. W.
Suite 400
Washington, D. C. 20005

Cheryl Lynn Schneider, Esq.
Communications Satellite Corporation
950 L'Enfant Plaza, S. W.
Washington, D. C. 20024


Margaret A. Ford